Improvements relating to Water Treatment Apparatus

The present invention relates to a water treatment apparatus programmable pass key.

Water treatment apparatus including for example ultra-pure treatment and filtration apparatus for laboratory, medical, clinical, research and other uses, are becoming increasingly sophisticated. Thus the need to ensure correct operation of such apparatus also requires to keep in step.

However, operation of such apparatus is still commonly accessible by any user whether trained or untrained. It is increasingly not desired to allow untrained users to carry out any significant resetting or re-operation of water treatment apparatus. This includes such operations as 'sanitisation'.

Sanitisation of water treatment apparatus is an important operation, and its incorrect operation,

such as conducting the operation too frequently or too infrequently, or whilst other operations are ongoing, can lead to significant damage to the apparatus and/or water product therefrom.

It is an intention of the present invention to obviate these disadvantages.

It is also possible to control water treatment apparatus from more than one access point for either display and/or control, with these access points being in separate or different locations. It is desired to have improved safety levels across the system to reduce the possibility of errors due to overlapping control.

Thus, according to one aspect of the present invention, there is provided a water treatment apparatus programmable pass key comprising a data carrier programmed with one or more predetermined codes, each code relating to an operation in or of the water treatment apparatus.

The pass key could have any suitable size, shape or design, including the design and style of other programmable keys such as for tools, cars, computers or other technical equipment. Generally such keys are usable with one hand, and are adapted to be easily storable.

The data carrier may be any form of programmable data carrier known in the art, generally including a computer chip or chips.

The operation(s) of the water treatment apparatus include all those known in the art, including any type of treatment of water, such as filtration, sanitisation or recirculation, and any type of reprogramming of the water treatment apparatus to provide different flow rates, levels of filtration, etc, as well as servicing operations of the apparatus.

The term "water treatment apparatus" as used herein includes a complete or stand-alone apparatus, as well as components or parts or fittings of water treatment apparatus, such as individual treatment units or replaceable or consumable parts such as a resin cartridge, as well as multi-site apparatus having more than one user or user-operable interface.

The latter apparatus can often be in different rooms or even buildings, often leading to complications where different users are using the same apparatus at the same time, but desiring different operations therefrom. The pass key of the present invention ensures that certain operations such as sanitisation can be limited to one or more authorised users.

Multiple access points may be connected across a network as known in the art, such as via an RS485

connection across a Local Area Network (LAN). Each access point may be individually programmed to have access to different operations, display screens or alarms. The access points may be configured to only allow one controller to be used at any time or may indicate the location of any network activity.

It may further be preferable to limit the location of activation of certain operations, such as sanitisation, to certain control points such as the location of chemical addition or storage.

The pass key of the present invention is preferably separable from the water treatment apparatus, and so includes an electronic circuit which can co-operate with an electronic circuit in the host water treatment apparatus. The co-operation of the pass key and water treatment apparatus may be one way, either from the pass key to the apparatus or vice-versa, or two way.

The pass key and the water treatment apparatus can communicate via any form of transmittable waveform, analogue or digital, including optical and magnetic contacts. Preferably these circuits communicate by physical electrical contact for maximum robustness and confirmation of connection, and to minimise interference by other means of communication. Preferably co-operation of the circuits is only possible when the communication is correctly created, and this is only achieved when the pass key

is correctly connected, installed and/or fitted with the host water treatment apparatus.

Such keys are known in the art, for example from Dallas Semiconductor Corp. (Dallas TX, USA). Their key is scanned and the correct type is confirmed before the serial number stored in the non volatile memory is checked prior to allowing access to the functions programmed for that device.

The pass key preferably includes a memory capacity and an ability to read/interrogate the water treatment apparatus, and/or vice versa.

The pass key may also include a database having relevant data relating to the water treatment apparatus such as validation information, process information, and/or manufacturing information. Typical information includes, but is not limited to, date of manufacture, date of the or each servicing and/or testing and/or other operation, the user, process parameters and data, quality control details, and possibly a unique reference code.

Thus, the present invention extends to a water treatment apparatus programmable pass key as herein before defined in combination with a water treatment apparatus adapted to receive and read the pass key.

The or each code of the pass key may include an enablement signal to the water treatment apparatus which signal may include means for the user to

uniquely control one or more different operations of the water treatment apparatus.

The pass key or one or more codes in the pass key may be time-dependent, so as to require renewal or reactivation after a certain time. The certain time could be a predetermined time period wherein the user requires retraining on the water treatment apparatus, or the apparatus requires different operations, and the like.

Different pass keys could be usable on the same water treatment apparatus, but each pass key could have a different number and/or type of code according to different types of access allowed by types of different users, such as laboratory personnel and service engineers.

The pass key of the present invention obviates the need for pass words or pin numbers commonly used in the art to gain access through a key board or key pad to technological apparatus, and can ensure that only authorised personnel can adjust key operating parameters, such as alarm conditions, auto-restart, etc.

The pass key may also allow access to operational data such as hours operated, number of stop/starts, sanitisations and the like.

The pass key can also instruct that only key personnel, perhaps those who have only had the

appropriate training, can initiate activities such as system cleaning and sanitisation. As chemicals or sanitisation agents can be pumped for some distance through the complete network of pipes and outlets for some types of water treatment apparatus, it is an essential safety aspect that only qualified personnel undertake this activity, and in such a way as to avoid conflict with simultaneous operators or users.

The pass key of the present invention could also ensure that for an operation such as cleaning and/or sanitisation, such a process can only proceed upon presentation of the key. In many present water treatment apparatus, sanitisation is carried out by the manual introduction of relevant chemicals as and when desired, without any ability of the water treatment apparatus to inhibit any user from carrying out the operation when unnecessary.

The cleaning and/or sanitisation process could include recirculation of the chemicals or sanitants, reduction of reservoirs levels, discharge to drains, rinsing with fresh water, all in an automatic process, such that down time of the apparatus is minimised due to the use of self-draining reservoirs with no hideout areas, deadlegs, etc.

Where there are more than one display or control stations, the current operation regime can be displayed and in certain circumstances, such as during a sanitisation, local operation or control

can be inhibited. Alternatively certain operations may be prevented from initiation by the distant access point.

A further advantage of the present invention is that it can be time coded, such that after a pre-set time, possibly installed during programming of the pass key, it would become inoperable. Thus for instance, this could be a signal that the pass key holder must attend ongoing product training at pre-determined intervals to ensure their knowledge of the product is kept up to date and their skill codes revalidated.

The present invention extends to a method of operating a water treatment apparatus, wherein one or more operations of the water treatment apparatus are only operable by conjunction of a programmable pass key as herein before defined with the water treatment apparatus, said pass key having a or the code adapted to operate the or each operation.